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## CHAPTER 3      SYSTEM OVERVIEW<sup>1</sup>

The Republic of Armenia is located in the Caucasus region between Turkey on the west, Azerbaijan on the east, Georgia on the north, and Iran on the south. It is mostly mountainous with some arable land in the valleys. A former Soviet Republic, Armenia is now an independent republic. The country's population ranges between 2.5 million and 3.2 million. Its industrial economic base declined severely with the dissolution of the Soviet Union. Its exports currently comprise mainly of agricultural products, mineral products, prepared foodstuffs, precious stones and metals, and machinery.

### *History of Armenia's Electricity Sector*

Armenia's electric power sector developed as part of the integrated Trans-Caucasian Power Network, which was part of the United Power System of the Soviet Union and coordinated power supply among Armenia, Azerbaijan and Georgia. The Armenian network was designed to operate in synchronization with the Trans-Caucasian system. Under the United Power System, power sector planning decisions were made with the interest of the entire system in mind. This system-wide perspective tended to disregard country-specific energy resources in favor of regional supply objectives. As a result, natural gas- and oil-fired plants were built in Armenia, even though the country has virtually no domestic fossil fuel reserves and must rely on imported natural gas and oil. This system perspective also led to the construction of the Armenian Nuclear Power Plant, whose two 440 MW units were commissioned in 1976 and 1980, respectively.

- ♦ Several factors have combined to radically change Armenia's power supply and demand situations:
- ♦ The Armenian Nuclear Power Plant was shut down in March 1989, after a severe earthquake struck Armenia in December 1988. While the plant was not directly affected by the quake, the Soviet government decided to close it to minimize the chances of any subsequent damage.
- ♦ After the breakup of the Soviet Union and with its former states' transition from centrally planned to market economies, a period of severe economic adjustment began in Armenia, which continues today.
- ♦ The conflict situation with neighboring Azerbaijan has cut off natural gas pipelines, electricity transmission lines and the main railroad to Armenia. Because Armenia imported

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<sup>1</sup> Extract from *Operating and Maintenance (O&M) Requirements Study for the Armenian Electric Sector*, prepared by Hagler Bailly for USAID, November 1999.

the majority of its gas from Turkmenistan and Russian Siberia through Azerbaijan and Georgia, the Azeri blockade severely limited the country's gas imports. The civil war in neighboring Georgia resulted in the closure of the only remaining railroad through the Abkhazia, connecting Armenia to the outside world, which has halted imports of residual oil for Armenia's thermal power plants. A Turkish blockade exacerbated the situation.

After fuel supplies were cut, Armenia's only remaining major gas pipeline route from Georgia, a neighboring Republic that was itself unsettled, was routinely subject to supply interruption and sabotage. Gas and residual oil supply destined for Armenia was often misappropriated to serve Georgian needs. For some time, northern Armenia continued to import limited amounts of hydropower from Georgia, but its transmission lines were also highly susceptible to sabotage.

Hence, Armenia was left with its only domestic energy resource - hydropower. Hydropower production was maximized from 1991 to 1994 as the country struggled to provide for the minimum needs of its economy and citizenry. The overuse of hydropower led to the serious lowering of the water level of Lake Sevan, the major water source for the 562 MW Sevan-Hrazdan cascade.

- The Armenian economy was firmly integrated with the Soviet centrally controlled economy and as a result, was highly dependent on inter-regional trade. The economic decline caused by the dissolution of the Soviet Union resulted in a considerable drop in electricity demand.

### *The Current Situation*

The energy crisis and lack of fuel brought about the rationing of power. When the energy crisis began in 1990, it was common for Armenian citizens to receive power for only two hours or less per day. The situation changed when the Government of Armenia restructured the power sector, which improved transparency, financial and operational discipline, and increased the levels of collection. It has also enabled power sector entities to pay for imported fuel and cover critical O&M needs. The re-commissioning of the Armenian Nuclear Power Plant (Medzamor) in the fall of 1995 has provided a cheap source of power offsetting fuel supply from neighboring countries.

Besides the geo-political changes affecting the region, Armenia's electricity sector has undergone many internal changes since the country became a republic in 1991. For example, before the Government began restructuring the power sector in the mid-1990s, Armenergo was the single state enterprise with responsibility for all decisions affecting electricity supply and transport. It managed all aspects of power sector operation and planning, as well as a number of ancillary enterprises that provided construction, generation reserves, repair, inventory, social services and various other "non-core" activities. Today, Armenergo has repositioned itself to become a state closed joint stock company (SCJSC) with responsibility for dispatching

electricity and arranging financial settlements among the parties involved in electricity transactions. Other major changes include:

- Generation facilities have also become SCJSCs.
- Some small hydro generators have been privatized.
- Further privatization of generation facilities is under consideration.
- The operation and maintenance of transmission facilities is now performed by another SCJSC “high voltage electrical network,” referred to as High Voltage (HV) Networks, which is headquartered in Yerevan. HV Networks comprises nine regions, each with its own headquarters, operating, maintenance and construction forces.
- Electric distribution and end-use services now fall under the purview of four SCJSCs or “discos” (distribution companies): the North, Central, South and the Yerevan Electric Networks, which are subject to near-term sale to private entities.